

REQUESTED BY:	Ronald Leuenberger	DATE OF REQUEST	10/3/02
REQUESTOR'S MANAGER / DESIGNEE APPROVAL (Signature & Date)		CHARGE WORK TO:	1000-K-73

SCOPE OF WORK

This OWR will cover Health Physics surveys and sampling necessary to perform *in situ* gamma measurements using the Radiation Scanning System (RSS). The RSS will be used to surveys; Area F, Area B Yard, Area D, Area Upper C, and other areas as time permits.

INSTRUCTION GENERATOR (Signature and DATE)		REQUESTED DUE NLT DATE	10/8/02
OWR CONTROL NUMBER:		SAFE WORK PERMIT NUMBER:	
OPERATIONS PRELIMINARY APPROVAL		DATE OF APPROVAL	
RISK ASSESSOR (Signature)		RISK LEVEL	
ENGINEERING		DATE OF APPROVAL	
ENVIRONMENTAL		DATE OF APPROVAL	
HEALTH PHYSICS RWP Required? ____YES ____NO RWP # _____		DATE OF APPROVAL	
SAFETY		DATE OF APPROVAL	
NTS PROJECT MANAGER / SENIOR WASTE OPERATIONS ENGINEER		DATE OF APPROVAL	
QA / WCO		DATE OF APPROVAL	
FINAL APPROVAL BY MANAGER OF OPERATIONS		DATE OF APPROVAL	
ASSIGNED PROJECT / FIELD SUPERVISOR:		DATE OF APPROVAL	
WORK COMPLETED (Project / Field Supervisor's Signature)		DATE OF APPROVAL	
NTS PROJECT MANAGER / SENIOR WASTE OPERATIONS ENGINEER		DATE OF APPROVAL	
QA/WCO		DATE OF APPROVAL	
REQUESTOR'S APPROVAL (Signature)		DATE OF APPROVAL	

Detailed Work Instructions

INSTRUCTION GENERATOR		SIGNATURE	
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1.0 PURPOSE:

Perform *in situ* gamma surveys using Radiation Scanning System (RSS).

2.0 SCOPE:

In situ gamma surveys performed with the RSS will;

- 1) Satisfy walkover scanning survey requirements per RDP-ESH-007, Decommissioning Plan
- 2) Identify elevated areas requiring further investigation and/or remediation (e.g., areas >30 pCi/g uranium)
- 3) Provide high sensitivity uranium measurement to qualify and quantify final survey Data Quality Objectives (i.e., uranium levels <30 pCi/g)

The following scope is included within these work instructions;

- 1) Training & Qualifications
- 2) Calibration
- 3) Health Physics Work Instructions
- 4) Derivation of Minimum Detectable Concentration (MDC)
- 5) Data Processing and Mapping

Quality records generated while performing RSS surveys shall be recorded in a RSS field log and/or appropriate survey maps. These records shall include;

- Daily operability checks
- Locations of RSS readings requiring follow-up sampling
- Sample collection information including date/time, requested analysis and sample ID
- Field measurements to support the project (e.g., dose rates)
- Unusual events
- Mapping

Detailed Work Instructions

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Training & Qualifications

Procedures

The Radiation Scanning System (RSS) was developed under DOE contract for *in situ* soil measurements at the Fernald Environmental Management Project (FEMP). Therefore, use of the RSS at the Ashtabula Environmental Management Project (AEMP) shall be performed according to the appropriate sections of the FEMP Field Manual, RTIMP-M-002. This Field Manual includes requirements for calibration and operation of the RSS.

Qualified Operator

Ron Reiman, Independent Consultant, is the qualified operator of the RSS. This qualification is based on his knowledge and experience of the RSS, and applied use of the RSS at FEMP.

Training

Ron Reiman will train Health Physics support personnel on the appropriate sections of RTIMP-M-002. This training will be documented in a RMIES Lesson Development Outline per RDP-TNG-100.

Field Deployment

Field use of the RSS will be performed under the supervision of Ron Reiman. Health Physics support for use of the RSS shall be limited to the tasks covered in the Lesson Development Outline.

Calibration

The RSS will be calibrated at FEMP according to requirements listed in RTIMP-M-002, Section 12, NaI Calibration. Documentation of this calibration shall be retained as a quality record for *in situ* soil measurements at AEMP.

3.0 PROCEDURE:

Health Physics Work Instructions

Operation of RSS

Health Physics support personnel will operate the RSS according to;

- 1) RTIMP-M-002, Sections 11, NaI Field Measurement, and Section 15, Global Positioning System, and
- 2) Training and instructions provided by Ron Reiman.

NOTE: Soil moisture results will be used for data processing of the RSS results.

Detailed Work Instructions

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Soil Moisture Samples

Collect a soil sample in the survey area each day the RSS is used. Place the sample in a sealed container and submit to the Environmental Laboratory with a Sample Request Form requesting percent soil moisture.

NOTE: Background dose rate will be used for data processing of the RSS results.

Background Dose Rate

Perform background dose rate surveys as necessary using a Bicorn microRem per RDP-HP-60.013, Area Exposure Rate Surveys. Record background dose rate results including applicable Bicorn microRem survey instrument information in the RSS Field Log.

Operability Checks

Perform RSS operability checks including a source check using a thourium-232 source per RTIMP-M-002, Section 10, NaI Setup. Record operability checks including source check results in the RSS Field Log.

NOTE: Cones, flags or other markers may be used to aid the operator in assuring complete coverage of the survey area.

Survey Area

Use the RSS to survey 100% of the soil surface area demarcated on the attached drawings. Perform this survey by pushing the RSS in successive passes over the survey area.

- 1) Push the RSS at a speed of approximately 1 mph (i.e., allows approximately 4 second acquisition time for activity within the field of view).
- 2) Each pass should be approximately 1 meters from the centerline of the previous pass (i.e., allows 0.4 meter overlap).

Survey Thresholds

For Areas D, Upper C, and F, mark (e.g., spray painted or survey flag) any area that exceeds the survey threshold of 30 pCi/g.

For Area B Yard mark a minimum of 3 locations corresponding to each of the following approximate soil concentration measured by the RSS:

- >90 pCi/g
- 90 pCi/g
- 60 pCi/g
- 30 pCi/g

Detailed Work Instructions

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Follow-up Samples

Collect the following soil samples;

Areas D, Upper C, and F 1 sample for each location ≥ 30 pCi/g.

Area B Yard 3 samples for each approximate concentration measured by RSS
(i.e., >90, 90, 60, and 30)

Collect approximately 2 liters of soil from the first 6 inches of surface soil according to RDP-LAB-138.207, Procedure for Sampling Soil, Vegetation, and Sediments. Submit samples to the Environmental Laboratory with a Sample Request Form requesting gamma or XRF uranium analysis.

Detailed Work Instructions

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Data Processing

Survey results will be downloaded onto a PC and data will be processed onto site maps (e.g., Geographic Information System mapping using Surfer 8.0). Data mapping will indicate locations for readings >30 pCi/g, and/or areas that require further investigation.

Minimum Detectable Concentration (MDC)

The MDC of the RSS for uranium will be established per RTIMP-M-002, Section 12.3, Statistic Calculation.

The accuracy and sensitivity (MDC) of the RSS will be verified by comparing RSS *in situ* uranium measurements to sample result (i.e., uranium measurements for follow-up samples).

4.0 DEFINITIONS:

Calibration – Process of deriving RSS activity response to know activity in soil. This is performed by measuring the activity emitted from uranium sources placed in the ground. Calibration of the RSS is performed according to RTIMP-M-002, Section 12, Calculation of Calibration Coefficients.

Data Processing – Is conducted to convert electronically recorded activity to uranium concentration. This is performed by software that derives the uranium concentration based on; 1) Measurements of activity, and background, 2) Calibration coefficient, and 3) Corrections for background dose rate, and soil moisture content. The RSS performs data processing based on a 4 second acquisition time, and provides a near real time (i.e., 4 second delay) response on the laptop display.

Field of View – the surface area that corresponds to the volume of earth from which 85% to 90% of the detected gamma photons originate. For the RSS the field of view is a radius of 1.2 meters (i.e., scan width of 2.4 meters).

Mapping – Color-coded representation of uranium concentration gradients plotted on a site map for the area surveyed using the RSS. This mapping is performed using Surfer 8.0, Geographic Information System (GIS) software, to plot colors corresponding to uranium concentration gradients on a site basemap.

Minimum Detectable Concentration (MDC) – Is an *a priori* estimate of the minimum net activity level that can be measured reliably by a particular system or technique under a given set of conditions. For the RSS, MDC is a statistically derived from the minimum detectable activity above background that yields a result above the detection limit 95% of the time.

Detailed Work Instructions

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Radiation Scanning System (RSS) – NaI detector (4” X 4” X 16” crystal) mounted on a 3-wheeled modified hand pushed jogger stroller. The RSS is battery operated using detector, signal processing electronic modules (DART™) and GPS components connected to a portable laptop computer.

REFERENCES:

RDP-ESH-007, Decommissioning Plan for the RMI Titanium Company Extrusion Plant Ashtabula, Ohio

RTIMP-M-002, RTIMP Field Manual

20701-RP-006, User Guidelines, Measurement Strategies, and Operational Factors for Deployment of *In Situ* Gamma Spectrometry at the Fernald Site, July 2002

RDP-HP-60.013, Area Exposure Rate Surveys

RDP-LAB-138.207, Procedure for Sampling Soil, Vegetation, and Sediments

5.0 RECORDS:

Quality Records generated for RSS surveys include;

- Calibration Records (i.e., per RTIMP-M-002, Section 12)
- RSS Field Log and associated maps
- Mapping (e.g., GIS mapping provided using Surfer 8.0)

7.0 ATTACHMENTS:

RTIMP-M-002, RTIMP Field Manual, Sections 10, 11, 12 and 15

DD-2525-00, Area F Parking Lot

DD-2532, Area B Yard

DD-2531, Area D

DD-2533, Area Upper C